## REMARKS

The office action dated February 20, 2003 has been carefully reviewed and these remarks are responsive thereto. Reconsideration and allowance of the instant application are respectfully requested.

The specification has been amended to correct typographical errors and to add clarifying subheadings regarding the examples. Claims 1-20 remain pending in this application. Claim 1 has been amended to address the rejections under 35 U.S.C. § 112, first paragraph, and to correct grammatical errors. New claims 3-20 have been added. Support for these amendments can be found in the claims as originally filed and throughout the specification. No new matter has been added.

**Objection to the Abstract**

The Abstract is objected to as not being directed to the claimed invention and not reciting the steps of the process. The Abstract has been amended. Withdrawal of this objection is respectfully requested.

**Claim Rejections Under 35 U.S.C. §112**

Claims 1 and 2 stand rejected under 35 U.S.C. § 112, first paragraph, as not providing enablement for forming a feed rod by "warm pressing" two compositions. Claim 1 has been amended, and this rejection is now moot. Withdrawal is respectfully requested.

Claims 1 and 2 are rejected under 35 U.S.C. § 112, first paragraph, because the specification does not provide enablement for the process as generically claimed. The Office Action states that the specification is enabling for a process of producing a fibrous monolith which includes sintering. The rejection is respectfully traversed.

Claims 1 (as amended) and 2 are directed processes for forming a feed rod that includes a first portion of a first composition surrounded by a second portion of a second composition and extruding the feed rod through a deposition nozzle onto a mechanically-controlled surface and mechanically manipulating one or both of the deposition nozzle and surface to create a green fibrous monolith composite. Claim 2 further specifies that the first and second compositions include metal, metal alloy, carbide, nitride, boride, oxide, phosphate and silicide. The specification at at least pages 5-9 discloses starting materials and methods for forming fibrous

monolith feed rods, or filaments. One of skill would be able to prepare the compositions used to form the fibrous monolith feed rod and to form the feed rods as claimed based on this disclosure. The specification at at least pages 11-12 discloses processes for extruding and mechanically depositing the feed rod to form green fibrous monolith objects as claimed. Furthermore, the specification provides several working examples for the various steps of the processes, from preparing the compositions used to form the feed rod to finishing the deposited green fibrous monolith object, that would also help guide one of skill in the art in practicing the invention. Applicants submit that a person of ordinary skill in the art would be able to practice the invention based on knowledge in the art, as well as guidance provided in the specification at least at pages 5-9 and 11-12 and in the examples. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 1 and 2 stand rejected under 35 U.S.C. § 112, first paragraph, because the specification does not disclose the "thermoplastic plasticizer" component recited in claim 1. Claim 1 has been amended to remove this limitation, and this rejection is now moot. Withdrawal is respectfully requested.

**Claim Rejections Under 35 U.S.C. §103**

Claims 1 and 2 stand rejected as unpatentable over Lachman (U.S. Patent No. 5,053,092) in view of deAngelis (U.S. Patent No. 5,398,193). This rejection is respectfully traversed. The cited documents, either alone or in combination, do not disclose, teach or suggest the invention claimed in claims 1and 2 or new claims 3-20.

The presently claimed invention is directed to automated processes for forming fibrous monolith composite articles. A feed rod that includes one or more green fibrous monolith filaments of ceramic and/or metallic materials is prepared. Each of the filaments has a core material generally surrounded by a relatively thin layer of shell material of a composition different from that of the core material. One or more filaments are passed through a deposition assembly to form the two- and three-dimensional composite articles. The deposition assembly includes an extrusion mechanism for depositing the filament in a directed manner onto a surface, or platen, where one or both of the extrusion mechanism and platen may be mechanically controlled, preferably using a motion architect computer program. The extrusion mechanism

may be heated and/or operated with pressure to facilitate extrusion of the fibrous monolith filament(s). In forming the composite articles from one or more filaments, the core material of the filament(s) is maintained as a discrete phase separated from other core material by the shell material, with adjacent portions of the shell material coming in contact and becoming essentially a continuous boundary material. The green fibrous monolith composite article can be further processed to provide a consolidated and densified finished composite article.

Lachman teaches forming extruded articles from at least two sinterable materials that are substantially uniformly distributed throughout the article. Significantly, the two or more phases are arranged so that the phases are substantially discontinuous. Lachman does not teach or suggest extruding a fibrous monolith filament that includes a core material generally surrounded by a shell material. Lachman further does not teach or suggest that, in forming the extruded article, the core material is maintained as one or more discrete phases while the shell material of the extruded filament contacts shell material of other portions of the filament to form an essentially continuous separating phase between the discrete core material phases. Instead, Lachman teaches that the two or more phases are substantially discontinuous throughout the article. Accordingly, the present claims are not obvious in view of Lachman.

deAngelis does not provide any teachings to cure the deficiencies of Lachman. deAngelis teaches a method of rapid prototyping through controlled layerwise deposition and extraction of materials. The Office Action states at page 4 that "deAngelis discloses the extrusion of a material, e.g. ceramic (col. 13, lines 39-54) onto a mechanically controlled surface in order to produce an article of desired shape." deAngelis teaches a sequence of operations wherein part material and complementary support material are deposited separately and removed layer-by-layer to build a part surrounded by the complementary materials. The complementary materials, which provide such things as structural support, chemical integrity and thermal integrity, are ultimately removed from the part material to obtain the fabricated part of a single material. At col. 13, lines 34-54, deAngelis teaches removable materials for the complementary materials along with materials for the part, "all such being depositable in multi-material, composite layers." deAngelis doe not disclose, teach or suggest the fabrication of a two- or three-dimensional part directly onto a work surface without the aid of additional methods and

materials. Furthermore, deAngelis does not recognize the effectiveness of any particular method of depositing the materials, including extrusion of molten materials as in the present invention, but only teaches that various processes can be used and that "[e]xamples of materials additive processes include powder deposition and melting, FIG. 5F, plasma spraying and heat/energy beam glazing, FIG. 5E, molten material dispensing, and pre-cured material dispensing and curing with heat source/energy beam." (Col 7, lines 64-68). Thus, deAngelis does not teach or suggest the claimed invention. Accordingly, the present claims are not obvious in view of deAngelis.

The Office Action states that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to extrude the material of Lachman onto a moving surface as that of deAngelis to produce an article of desired configuration". One of skill in the art following the teaching of Lachman would not be motivated to extrude the material onto a moving surface based on deAngelis' teaching of fabrication of a single material part using a second, removable material to assist with the fabrication. Even if the material of Lachman were extruded onto a moving surface as in deAngelis, one would not arrive at the present invention with its direct fabrication of a composite part from one or more fibrous monolith filaments having a core material surrounded by a shell material.

Therefore, neither of the cited references, whether taken alone or in combination, disclose, teach or even suggest the presently claimed invention, and the present claims 1-20 are not obvious.

## CONCLUSION

In view of the above amendments and remarks, prompt reconsideration and full allowance of the claims pending in the subject application are respectfully requested. All rejections having been addressed, applicant respectfully submits that the instant application is in condition for allowance, and respectfully solicits prompt notification of the same.

The Commissioner is authorized to debit or credit our Deposit Account No. 19-0733for any fees due in connection with the filing of this response.

If the Examiner should have any questions, the Examiner is invited to contact the undersigned at the number set forth below.

Respectfully submitted,

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